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A new species of *Drapetis* Meigen *sensu stricto* from Natal, South Africa (Hybotidae: Tachydromiinae: Drapetini)

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ABSTRACT

The taxonomic position of the cosmopolitan hybotid genus *Drapetis* Meigen, 1822 is discussed in relation to its former placement in the Empididae. Biological data for adults and larvae of the genus are reviewed. *Drapetis hiatus*, a new Afrotropical species of the nominate subgenus, is described and illustrated from Merrivale (Natal, South Africa). A new key to the three known Afrotropical species of *Drapetis sensu stricto* is provided.

INTRODUCTION

Drapetis Meigen, 1822 is a small genus of Hybotidae. It has a world-wide distribution (Chvála 1975) and close affinities with *Elaphropeza* Macquart, 1827. The two genera may be given subgeneric status in *Drapetis* (Chvála & Kovalev 1989), or generic status (Collin 1961, Rogers 1983, Smith 1989). *Elaphropeza* is recognised here as a subgenus of *Drapetis* in agreement with Chvála & Kovalev (1989). Lack of bristles on the shaft of the hind tibia differentiates *Drapetis sensu stricto* from the subgenus *Elaphropeza* (Collin 1961, Smith 1969). The status of a third subgenus (*Crossopalpus* Bigot, 1857) has been uncertain. Collin (1961) accorded it generic status, which did not seem to come into general use until Kovalev (1972) again gave it generic status. Chvála (1975) discussed the history of *Crossopalpus* in more detail and accepted Kovalev's (1972) proposal; since then Chvála & Kovalev (1989) and Smith (1989) have accepted this.

The importance of descriptions of new species of *Drapetis* from the southern hemisphere cannot be denied. In general the empidids (*sensu lato*) are poorly collected from the south temperate regions (Woodley 1989) and definitive works such as Smith (1969) are evidence that these faunas are incompletely known. Even where empidids are more abundant in the northern hemisphere, *Drapetis* is uncommonly encountered (Kovalev 1972).

Only two named species of *Drapetis sensu stricto* are currently known from the Afrotropical Region, viz. *D. inquilina* Séguy, 1945 from Mt Elgon (2 470 m) in Kenya and *D. capensis* Smith, 1967 from Skoorsteenkop (198 m), Hout Bay in the Cape Province of South Africa [*ca*. 34°02'S:18°22'E]. A third species is described below based on a copulatory pair collected by Dr B. R. Stuckenberg near his home at Merrivale in Natal.

Outside the Afrotropical Region 20 species are known from the Palaearctic (Chvála & Kovalev 1989), two from the Oriental Region (Smith 1975), three from

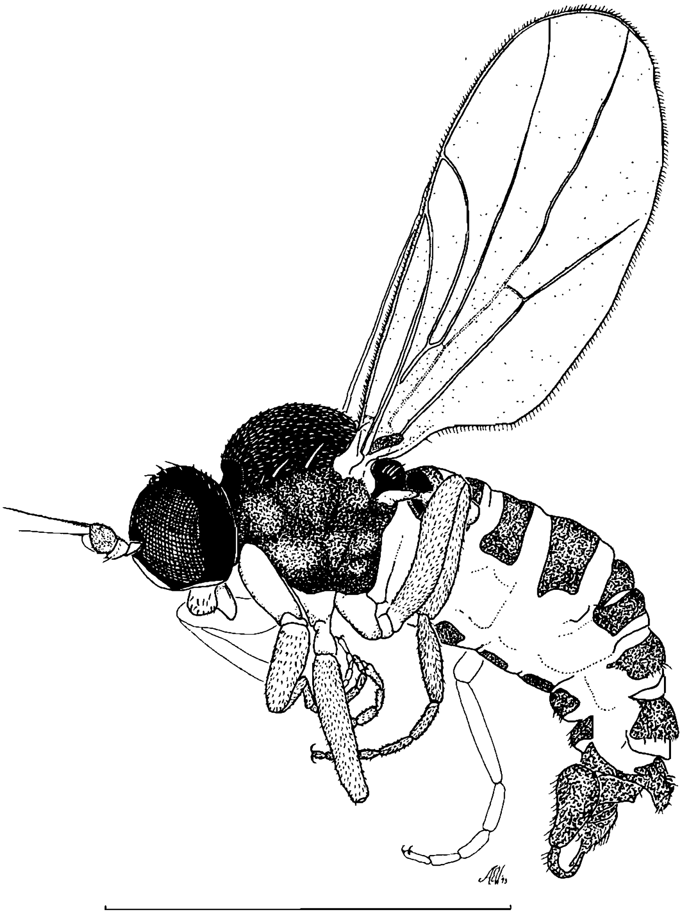


Fig. 1. *Drapetis hiatus* sp. n. holotype male. Scale = 1 mm.

Australasia (Smith 1989), 16 from the Nearctic (Melander, 1965) and 13 from the neotropics (Rogers 1983). The figure for the Nearctic Region may be artificially low since Steyskal & Knutson (1981) give a total of 40 species for *Drapetis sensu lato* (ie. including *Crossopalpus* and *Elaphropeza* as subgenera), while Rogers (1989) listed 8 species in the *Drapetis assimilis* group.

Little is known about the biology of Afrotropical *Drapetis*. The two males of *D. capensis* described by Smith (1967) were taken in an insect trap on a mountain slope. This was positioned in dense indigenous woodland with a thick substrate of debris, rotten logs and branches. The surrounding landscape was dry *Protea* heath (Brinck & Rudebeck 1955). Séguy (1945) provided no habitat data for *D. inquilina* and nothing is known about the biology of the new species described below.

Data concerning the Palaearctic species comprises the bulk of biological knowledge for *Drapetis*. Adults of some species have been noted as incidental flower visitors (Tuomikoski 1952, Chvála 1975) and may be nectariferous (Tuomikoski

1952). Other species have been found on tree trunks, running in and out of cracks in the bark, in dense vegetation, at the entrance to a rabbit's burrow, and are also known to be strong fliers in contrast to other Tachydromiinae (Collin 1961, Kovalev 1966 1972, Chvála 1975). In northern European-Russia, species show a preference for mesophytic deciduous woodland and are active only in the summer months (Kovalev 1972).

Hybotidae are known largely to be primarily predacious, with nectar feeding as a secondary development coincident with the diversification of Angiospermae in the Upper Cretaceous (Waters 1989). Predation on red spider mites is recorded from California (Fleschner & Ricker 1953). Kovalev (1966) reports that some species are predacious on Agromyzidae and Collin (1961) lists *Thrips* as prey. Larvae are probably predacious and adults have been reared from an owl's nest and from rotten wood and debris in rot holes (Collin 1961, Chvála 1975). In the Nearctic, some species have been reared from roots and myxomycetes fungi (Steyskal & Knutson 1981).

The classification of Empidoidea (to which Hybotidae belongs) has been subject to some debate in recent literature. Traditionally the superfamily comprises the families Empididae *sensu lato* and Dolichopodidae. There is no single apomorphy defining the Empididae *sensu lato* exclusive of the Dolichopodidae (Woodley, 1989) and consequently there is little doubt that the former family is paraphyletic (Chvála 1981 1983, Woodley 1989).

In an attempt to find a solution to the paraphyletic nature of the Empididae *sensu lato*, Chvála (1983) provided a new classification for the Empidoidea, which divides the Empididae into four segregate families. These are Empididae *sensu stricto*, Hybotidae, Atelestidae and Microphoridae. This classification has been used by Chvála & Kovalev (1989), but rejected by Woodley (1989). Woodley's rejection of this classification was because Chvála's (1983) work was considered preliminary (based primarily on Palaearctic material), and that the character states used by him were mostly plesiomorphic. However, despite Woodley's caution, Chvála (1983) provides sound evidence for the monophyly of Hybotidae which I accept. Twelve apomorphies supporting this view are discussed by Chvála (1981 1983), the most important of which is the dextral rotation of the male genitalia through 90° or more.

METHODS

The description of the new species is based on the holotype male. Bilaterally symmetrical features are described in the singular. Wing length was measured from the base of the costa to the wing tip. Thoracic setae are best viewed from the dorsal aspect. Description of pruinosity was not possible, since the specimens are preserved in ethanol.

Terminology and abbreviations concerning gross morphology generally follow Chvála (1983) and Crosskey (1984), while that concerning the male postabdomen follows Chvála (1983). The term 'periandrium', *sensu* Griffiths (1972), is used to describe the fused upward growth of the basimeres (or gonocoxites) and the fusion of these dorsocentrally in the absence of the true epandrium. In *Drapetis*, however, the periandrium is not fused.

Genitalia of the new species were fully exposed, viewed *in situ* and in relation to the hypopygium rather than to the pregenital part of the abdomen. Those of the *D. capensis* holotype were cleared in hot potassium hydroxide, then viewed and stored in glycerine. Drawings were made using a Wild M5 stereomicroscope and a Wild 1,25x drawing tube. Label data are quoted verbatim with forward slashes between lines and semicolons between labels. Data on labels identifying the specimens, ie. holotype and paratype labels, have not been quoted.

TAXONOMY

Key to Afrotropical species of *Drapetis sensu stricto*

1 Head and thorax reddish-brown (Kenya) .... **inquilina** Séguy
– Head and thorax black (southern Africa) 2

2 Abdomen black; seta at base of costa long (reaching beyond humeral crossvein) (Fig. 2), R_1 weakly curved towards wing margin (Fig. 2); ♂ genitalia closely associated and bulbous (Fig. 3) .... **capensis** Smith
– Abdomen dull brown; seta at base of costa short (not reaching humeral crossvein) (Fig. 1), R_1 strongly curved towards wing margin (Fig. 1); ♂ genitalia loosely associated, not bulbous (Figs 4 & 5) .... **hiatus** sp. n.

Drapetis hiatus sp. n.

Figs 1, 4–6

Etymology: L. *hiatus* = gaping, referring to the loosely associated parts of the postabdomen.

Wing length 1,29 mm.

Colour: Head and notum glossy black, remainder of thorax glossy dark brown. Legs, mouthparts and epistomal margin pale yellow. Antennae brown. Haltere buff. Abdomen dull brown with membranous parts pale buff, anterolateral bulla glossy black. Genitalia glossy brown, but cerci pale buff.

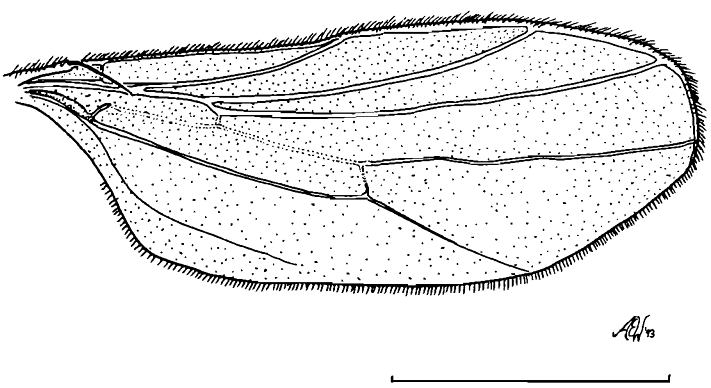
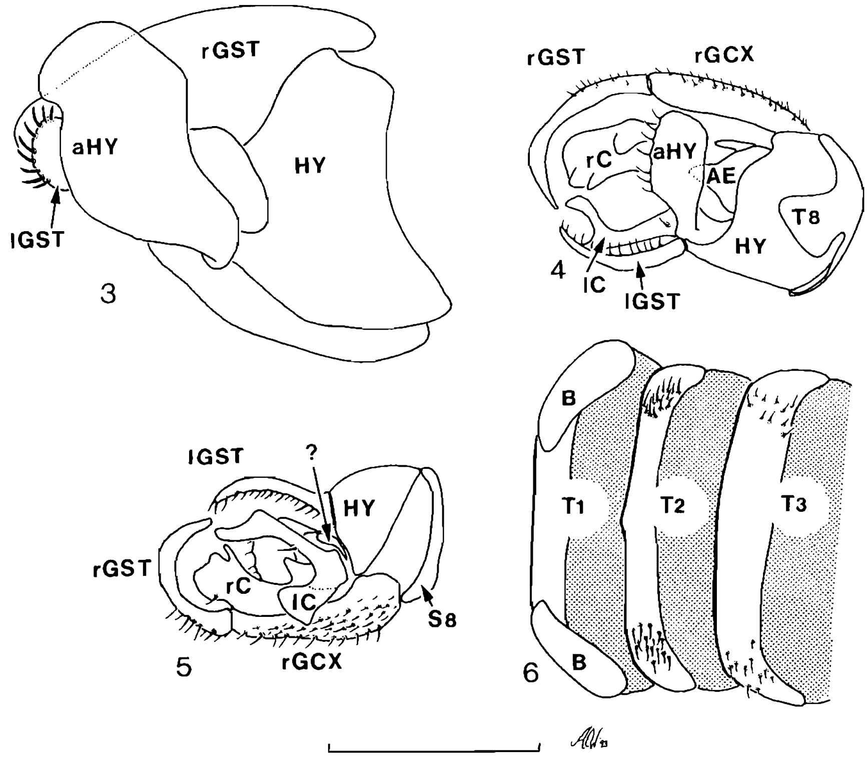


Fig. 2. *Drapetis capensis* Smith, 1967 holotype male, right wing, dorsal view. Scale = 1 mm.

Head: Globose. Eye margin notched at antennal insertion. Antennal segments 1 and 2 bare except for terminal fringe of setae with 1 strong seta ventrally on apex of segment 2, which is slightly paler than segment 3. Antennal segment 3 ovate, covered with short dense setae. Arista terminal, twice as long as antennal segments 1–3, finely pubescent. Frons tapered to width of ocellus near antennal insertion. Face almost parallel-sided, tapered slightly towards antennal insertion. 2 pairs ocellar setae, weak anterior pair cruciate, stronger posterior pair divergent. Occiput with short, pale setae, 1 pair strong vertical setae pointed forwards and inwards. Palpi with long, pale setae.

Thorax: Notum with pale, short setae; pleurites bare. Setation: 2 notopleurals (strong posterior seta twice as long and strong as weaker anterior seta); 1 strong pre-alar, 1 weak supra-alar, 1 strong postalar, 1 sub-apical and 2 weak lateral scutellars; 4 setae on postnotum. Legs pale yellow with short pale brown setae which are stronger, denser and darker on tibia and tarsomeres. Femora each with small anterior pre-



Figs 3–6. *Drapetis* species, holotype males. 3. *D. capensis* Smith, 1967 male postabdomen, ventral view. 4–5. *D. hiatus* sp. n. male postabdomen. 4. ventral view. 5. Dorsal view. 6. *D. hiatus* sp. n. abdominal T1–3, dorsal view (stippled area is membranous). [AE = aedeagus, aHY = appendage of hypandrium, B = bulla, HY = hypandrium, lC = left cercus, lGST = left gonostylus, rC = right cercus, rGCX = right gonocoxite, rGST = right gonostylus, S8 = sternite 8, T1, T2, T3 & T8 = tergites 1, 2, 3 and 8, ? = possible detached appendage of left gonocoxite.] Scale = 0,25 mm.

apical bristle and single long pale basoventral seta . Wings hyaline, evenly covered with microtrichia on both surfaces, veins brown, but base of M extending to a little beyond m-cu, r-m and m-cu unpigmented. Wing margin entirely fringed with brown setae. Costa discontinuous beyond M, slightly thickened between R_1 and R_{4+5} and with short basal seta, not reaching humeral crossvein. Subcosta contiguous with R_1, evanescent before reaching margin. Humeral crossvein poorly pigmented. R_1 strongly curved before reaching margin. M slightly sinuous beyond m-cu. Crossvein r-m very short, positioned at middle of discal cell. Distal portion of Cu_1 (beyond m-cu) 1,65 times longer than m between r-m and m-cu. Anal vein represented by basal fold only. Haltere large (length subequal to long axis of eye), knob twice length of stem and base, bulbous, as wide as stem is long.

Abdomen (distended by preservation in ethanol): T1 with darkly pigmented, oval bulla anterolaterally (Fig. 6). Setae sparse, brown and short, stronger and in dense patches laterally on T2 and T3, slightly weaker on T3 (Fig. 6) and long on posterior margin of T8 and sternites S6–8. Genitalia strongly asymmetrical (Figs 4 & 5), rotated 180° dextrally. Periandrium not fused dorsally. Right gonocoxite (situated on the left due to rotation) prominent, swollen basally, with long pale setae; gonostylus narrow, sickle-shaped, basally setose. Left gonocoxite fused with hypandrium; small detatched appendage present between base of left gonostylus and left cercus. Left gonostylus narrow, setose on entire length. Aedeagus small and obscured by appendage of hypandrium, the latter strap-shaped and fringed with fine setae. Cerci well developed, right cercus larger than left one, with secondary lobes and protrusions developed.

Female: Similar to ♂, but with the following differences. Without anterolateral bulla on T1 and lacking dense patches of short dark setae laterally on T2 and T3. T4 and T5 with lateral setae stronger and darker than dorsal setae, but these not strongly grouped and weaker than in ♂. Postabdomen not rotated.

Material examined: ♂ holotype and 1 ♀ paratype 'S AFRICA: Natal #3G / Merrivale, Tshwalabenyoni / 29°31'S:20°15'E 1000m / Date: 11.x.1992 / Coll: B.R. Stuckenberg'; 'in copulo.'; Natal Museum Type number 1607. In good condition, but holotype with damaged right wing; preserved in ethanol.

DISCUSSION

D. hiatus differs from other known species of *Drapetis sensu stricto* in the development of the male genitalia, which have extraordinary long gonostyli. *D. capensis*, the other southern African species, differs from *hiatus* in the following characters. Ocellar setae stronger. Arista 1,33 times as long as antennal segments 1–3. Femora with pre-apical setae long and more obvious. Humeral crossvein more strongly pigmented (Fig. 2), seta at base of costa long (reaching beyond humeral crossvein), thickening of costa between R_1 and R_{4+5} more distinct, R_1 weakly curved, r-m positioned before middle of discal cell, distal portion of Cu_1 (beyond m-cu) little longer than m between r-m and m-cu, anal vein more clearly defined. Abdomen entirely black. Differences in the male genitalia of *hiatus* and *capensis* are striking (cf. Fig. 3 with Figs 4 & 5).

The anterolateral bulla of T1 is more prominent in *D. hiatus* (Fig. 6), but this may be because the bulla of *D. capensis* is the same colour as the tergite ground-colour. *D. capensis* has fine white pubescence on the pleurites of the thorax, but comparison cannot be made with *D. hiatus* because this character is not visible on the ethanol-preserved specimens.

Chvála (1975: 28, 247) mentions short curved bristles on the sides of abdominal segments 4 and 5 in *Drapetis*, and stated that the shape of these bristles provide important diagnostic features. Smith (1969: 8) also mentions these bristles on 'the middle segments of the abdomen' and I believe these to be the same setae I noted on T2 and T3 in the male of *D. hiatus*, although similar weaker setae were observed on T4 and T5 in the female. Although Kovalev (1972) has figured and described similar setae, the full diagnostic significance of these will only become known when comparative studies are made in future revisions.

The two type specimens were collected from a garden surrounded by mixed *Acacia* woodland, bordering a steeply-sided valley of mixed indigenous vegetation. The *Acacia* woodland is dominated by the following *Acacia* species: *A. ataxacantha*, *A. caffra*, *A. karoo* and *A. sieberana*. The exact origins of the specimens cannot be determined, since numerous insect species rise out of this valley on thermal upcurrents. Consequently nothing can be said about the biology of *D. hiatus*. It may well originate from damper vegetation alongside the Umgeni River in the valley.

The material examined of *D. capensis* was: ♂ holotype 'S. Afr. Cape Prov. / Cape Peninsula. Hout / Bay. Skoorsteenkop. / 2.2.1951. No.106'; 'Swedish South Africa Expedition / 1950–1951 / Brinck – Rudebeck'; 'Insect trap / Alt ft' [altitude omitted]; Zool. Mus. Lund Sweden Type No. 1782: 1–2. In good condition, genitalia dissected and preserved in glycerine.

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